

## Stimulants

Stimulants are chemical substances that stimulate the brain and the central nervous system. In this respect their activity is the opposite of depressants. Generally they cause increased alertness and wakefulness. In many cases they also act to decrease appetite.

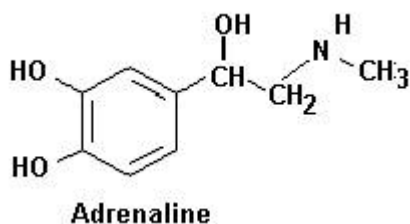
### Amphetamines

Amphetamine, dextroamphetamine, and methamphetamine are collectively referred to as amphetamines.

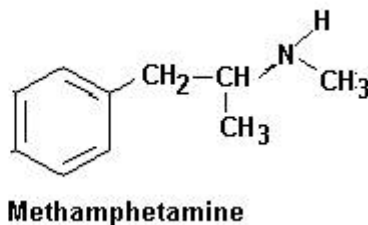
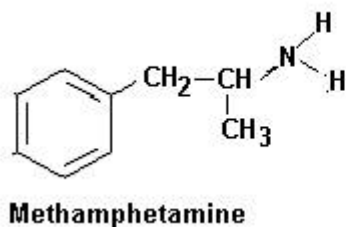
Amphetamine was first marketed in the 1930s as Benzedrine, an over-the-counter inhaler to treat nasal congestion. By 1937, amphetamine was available by prescription in tablet form and was used in the treatment of the sleeping disorder narcolepsy and the behavioral syndrome called minimal brain dysfunction (MBD), which today is called attention deficit hyperactivity disorder (ADHD). During World War II, amphetamine was widely used to keep the fighting men going; both dextroamphetamine (Dexedrine) and methamphetamine (Methedrine) became readily available.

Medical uses of amphetamines include the treatment of some forms of depression, narcolepsy, and asthma. In the body they mimic the effect of adrenalin by constricting arteries, increasing perspiration activity and stimulating brain activity. The result includes increased heart rate, blood pressure, wakefulness, restlessness, agitation and insomnia. The results are temporary, and are usually followed by fatigue, insomnia, and depression.

Amphetamines have chemical structures similar to adrenalin. The structure of adrenalin is shown below



Amphetamine and methamphetamine structures are very similar, having the hydroxyl groups removed from the phenyl ring and some variations in the side chain



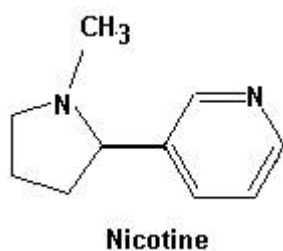
As use of amphetamines spread, so did their abuse. Amphetamines became a cure-all for helping truckers to complete their long routes without falling asleep, for weight control, for helping athletes to perform better and train longer, and for treating mild depression. Intravenous amphetamine abuse spread among a subculture known as "speed freaks." With experience, it became evident that the dangers of abuse of these drugs outweighed most of their therapeutic uses.

Amphetamines are highly addictive and toxic. Their long term use can be quite serious leads to deterioration of a number of body systems. Chronic abuse produces a psychosis that resembles schizophrenia and is characterized by paranoia, picking at the skin, preoccupation with one's own thoughts, and auditory and visual hallucinations. Severe depression and violent or erratic behavior are also common among meth addicts.

The illegal production and marketing of methamphetamines also results in criminal activity as addicts resort to illegal activities to support their habit

### Nicotine

Nicotine is a mild but highly addictive stimulant found in tobacco. Its initial stimulant response is usually followed by mild depression which encourages frequent use. It also reduces urine output



Nicotine is a vasoconstrictor that increases blood pressure and heart rate. This puts increased stress on the heart, which probably accounts for the high correlation between smoking and heart disease. It also increases the likelihood of coronary thrombosis by increasing the level of fatty acids in the blood stream. As a stimulant it may also increase stomach acidity and the incidence of peptic ulcers

In addition tobacco smoke contains a number of other harmful substances that are detrimental to human health. The increased level of carbon monoxide in smoke reduces the ability of the blood to carry oxygen. Tobacco smoke also contains several known carcinogens

In summary, medical evidence indicates that smoking is highly correlated with

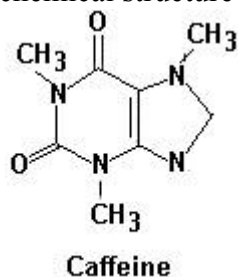
- lung cancer
- emphysema
- cancer of the larynx and mouth
- heart disease
- chronic bronchitis

## Caffeine

Caffeine is a mild stimulant and a weak diuretic. Caffeine stimulates the central nervous system, by working inside nerve cells to increase the rates of cellular metabolism. As a result the rate at which energy from metabolism is increased. Caffeine stimulates the central nervous system heart, kidneys, lungs and arteries supplying blood to the heart and brain. In moderate doses caffeine enhances alertness, well being motivation, and concentration. Physical coordination and timing may be adversely affected by higher doses.

In small amounts caffeine is considered relatively harmless. In large quantities it may cause sleeplessness. Studies indicate that continued consumption of caffeine may lead to some tolerance but no physical addiction. It may lead to minor psychological addiction. Because it can stimulate respiration. It is also a vasoconstrictor which means that it has potential use in the treatment of migraines.

The chemical structure of caffeine is shown below

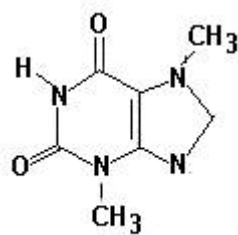


Caffeine is a heterocyclic amine in which one of more carbon atoms in the ring is replaced by a nitrogen atom. In this respect it resembles nicotine and may be related to its stimulant activity

Caffeine is found in coffee and tea, which are the primary sources for human consumption. It is also added to many soft drinks including colas. A closely related compound, theobromine, is found in chocolate. Its physiological effects

are similar to caffeine

The structure of theobromine is



**Theobromine**

It differs from caffeine only by the lack of the methyl group on the six member heterocyclic ring